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Dactylogyrid Monogeneans from Surgeonfish of Southern Japan

By

Masaaki MACHIDA

Department of Zoology, National Science Museum, Tokyo

A survey was made on the parasites of marine fishes of Irabu Island, one of the Miyako Islands, lying midway between Okinawa and Taiwan. The fishes for study were obtained by commercial drive-in net. The monogeneans were fixed in acetic sublimate under slight cover glass pressure, stained with Heidenhain's hematoxylin and mounted in balsam. The present report deals with two species of dactylogyrid monogeneans, *Pseudancyrocephalus duplicatus* YAMAGUTI, 1968 and *Nasoancyrocephalus diorchis* n. g., n. sp., parasitic together on the gills of a surgeonfish, *Naso unicornis* (Family Acanthuridae). The specimens are deposited in the collection of the National Science Museum, Tokyo.

Recently, LEBEDEV (1978) cited the examples of simultaneous parasitism of two closely related monogeneans on a single host fish, and discussed the synecological and evolutionary aspects of their existence. Following the previous report (MACHIDA, 1978), the present report provides another example of such a case.

Family Dactylogyridae Subfamily Ancyrocephalinae

Pseudancyrocephalus duplicatus YAMAGUTI, 1968

(Fig. 1)

Host. *Naso unicornis* (FORSKÅL).

Habitat. Gills.

Locality. Irabu Island, Okinawa Prefecture.

Date. 1-V-1978.

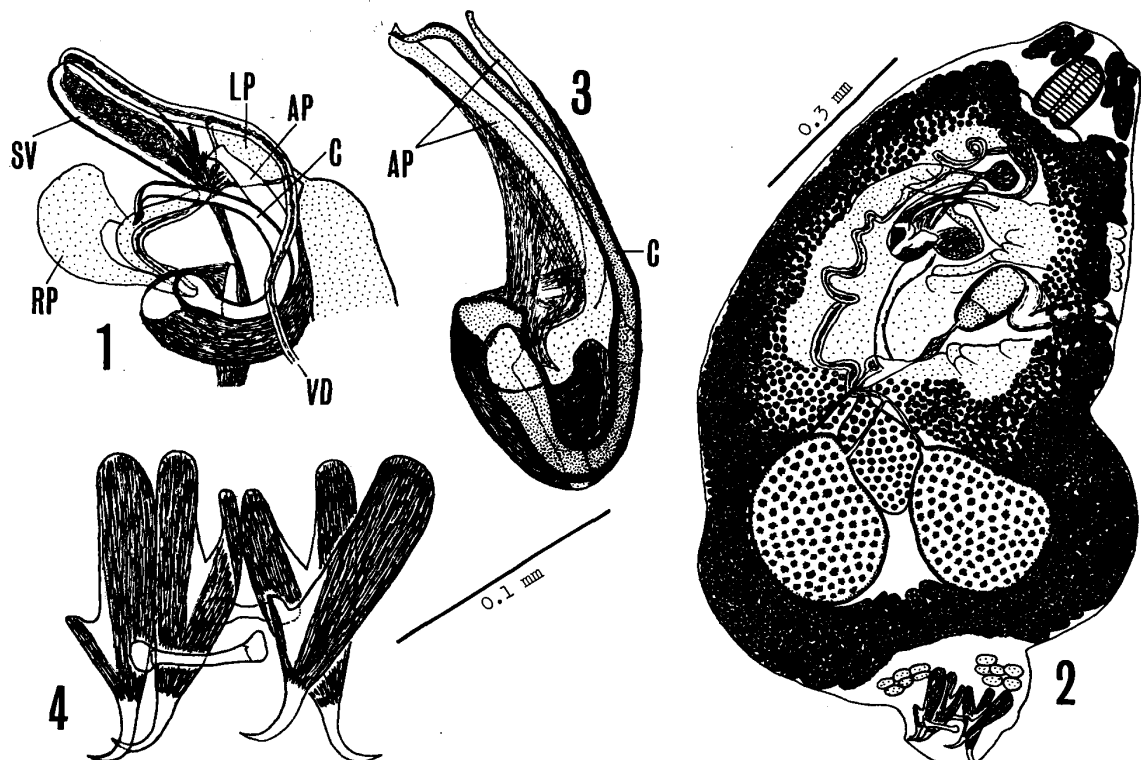
Specimen No. NSMT-PI-2116 a.

Description. Body fusiform, 1.2–1.4 mm long and 0.47–0.65 mm wide. Opisthaptor provided with two pairs of anchors and a pair of bars. Dorsal anchor with a rudimentary dorsal root, 133–142 μ long lineally from tip of longitudinally striated ventral root to height of curve of blade; dorsal bar slender, swollen at each end, 44–49 μ long; ventral anchor with longitudinally striated, bifurcated root, 144–160 μ long lineally from tip of ventral root to height of curve of blade; ventral bar plump, 28–31 μ long. Cement glands well developed. Head rounded at apex, 0.13–0.20 mm wide at base, with head organs antero-laterally. No compact eye-spots. Mouth a little behind head end; pharynx cylindrical, 111–129 \times 59–88 μ ; esophagus

not recognizable; caeca terminating separately near posterior end of body proper.

Testis subglobular, $158\text{--}199 \times 255\text{--}311\ \mu$, postequatorial. Vas deferens winding medial to left caecum and lateral to copulatory organ, entering into seminal vesicle a little behind caecal bifurcation. Seminal vesicle club-shaped, $64\text{--}77 \times 23\text{--}28\ \mu$, surrounded by spiral muscle fibers. Copulatory organ sclerotized, consisting of a tubular cirrus and an accessory piece. Cirrus C-shaped, $156\text{--}182\ \mu$ long, receiving ducts from seminal vesicle and two prostatic reservoirs at its rounded base. Accessory piece C-shaped like cirrus, running dorsal to cirrus, with its base in connection with base of cirrus. There are two prostatic complexes; right prostatic reservoir saccular with thin wall, $41\text{--}103 \times 26\text{--}54\ \mu$, antero-dextral to base of cirrus, connected with the anterior and right group of prostatic cells; left prostatic reservoir triangular with relatively thick muscle wall, $41\text{--}80 \times 18\text{--}23\ \mu$, anterior to copulatory organ, receiving the collective prostatic duct from the left and posterior group of prostatic cells. Genital pore at the center of C-shaped cirrus.

Ovary subglobular, $97\text{--}107 \times 168\text{--}265\ \mu$, equatorial. Uterus running straight to genital pore. No eggs observed. Vagina opening on right margin or submargin of



Figs. 1-4. — 1. Male terminal genitalia of *Pseudancyrocephalus duplicatus* YAMAGUTI, 1968, ventral view. — 2-4. *Nasoancyrocephalus diorchis* n. g., n. sp. — 2. Entire worm, dorsal view. — 3. Copulatory organ, ventral view. — 4. Anchors and bars, dorsal view. AP, accessory piece; C, cirrus; LP, left prostatic reservoir; RP, right prostatic reservoir; SV, seminal vesicle; VD, vas deferens.

body at level of posterior end of copulatory organ; vaginal duct somewhat curved. Seminal receptacle saccular, 20–26 μ wide; a narrow canalis receptaculi seminis terminating blindly at antero-dorsal part of ovary. Vitellaria co-extensive with caecum.

Discussion. YAMAGUTI (1968) described this species based on the material from *Naso unicornis* in Hawaiian waters, and there has been no record on this species since then. The present specimen closely resembles YAMAGUTI's description, but the marginal hooklets were not detected in the opisthohaptor owing to the thickness of the present whole mounts. Furthermore, YAMAGUTI (1968) seems to have taken dorsal for ventral in the position of anchors and bars, and *vice versa*.

Nasoancyrocephalus diorchis n. g., n. sp.

(Figs. 2–4)

Host. *Naso unicornis* (FORSKÅL).

Habitat. Gills.

Locality. Irabu Island, Okinawa Prefecture.

Date. 1–V–1978.

Specimen No. NSMT-PI-2116 b.

Description. Body conical to fusiform, 1.1–1.5 mm long and 0.50–0.86 mm wide. Opisthohaptor set off from body proper, provided with two pairs of anchors and a pair of bars. Dorsal anchor with a rudimentary dorsal root, 129–140 μ long lineally from tip of longitudinally striated ventral root to height of curve of blade; dorsal bar slender, swollen at each end, 50–62 μ long; ventral anchor with longitudinally striated, subequal bifurcate root, 126–139 μ long lineally from tip of ventral root to height of curve of blade; ventral bar dumbbell-shaped, 31–41 μ long. Cement glands well developed. Head end blunt or truncated, with head organs antero-laterally. No compact eye-spots. Mouth in front of pharynx; pharynx cylindrical, 103–121 \times 64–93 μ ; esophagus not recognizable; caeca terminating separately near posterior end of body proper.

Testes two, oval, right testis 194–311 \times 148–224 μ , left testis 230–306 \times 153–230 μ , juxtaposed in posterior half of body proper. Vas efferens arising from anterior part of testes and uniting with each other near anterior end of ovary. Vas deferens winding forward to left caecum and lateral to copulatory organ, entering into seminal vesicle a little behind caecal bifurcation. Seminal vesicle comma-shaped, broad proximally, 34–54 μ wide, surrounded by thick muscle wall, lying anterior to two prostatic reservoirs. Copulatory organ sclerotized, consisting of a tubular cirrus and two accessory pieces. Cirrus like a fishing hook, 297–337 μ long, receiving ducts from seminal vesicle and two prostatic reservoirs at its irregular thick base, and with its distal point slightly incurvate. Accessory pieces arising from common base of cirrus dorsally, directed forward parallel to cirrus; one piece broad, with the distal point somewhat recurved, the other tapering to the distal point. Base of cirrus

surrounded by muscle bulb, whose fibers extend along the accessory pieces by way of base of accessory pieces, and some fibers fan out antero-sinistrally. There are two prostatic complexes; anterior prostatic reservoir subglobular, with wall formed by longitudinal muscle fibers, $54-103 \times 52-76 \mu$, between seminal vesicle and genital pore, connected with the left and posterior group of prostatic cells; posterior prostatic reservoir saccular, enclosed in a thick sheath of spiral muscle fibers, $64-95 \times 44-57 \mu$, right to copulatory organ, receiving the collective prostatic duct from the anterior and right group of prostatic cells. Genital pore near distal end of cirrus.

Ovary subglobular, $71-204 \times 102-163 \mu$, postequatorial, just in front of or between anterior parts of testes. Uterus running straight to genital pore. No eggs observed. Vagina voluminous, cylindrical, occasionally bending at proximal portion, opening on right margin of body at level of base of copulatory organ; vaginal reservoir sclerotized, elliptical, $108-149 \times 59-101 \mu$, vaginal duct narrow and short, its proximal portion expanding in fusiform, $38-62 \times 18-26 \mu$, surrounded by fine spiral muscle fibers; seminal receptacle saccular, $45-70 \mu$ wide, giving off a narrow canal which may be ligament distally, terminating blindly at antero-dorsal end of left testis. Vitellaria co-extensive with caecum, confluent in posttesticular area.

Discussion. The present genus resembles closely related *Pseudancyrocephalus* YAMAGUTI, 1968 in having longitudinally striated anchors, two prostatic reservoirs and a canalis receptaculi seminis, but differs from it in the possession of two testes, which has never been observed in any of the known ancyrocephaline monogeneans, the seminal vesicle lying anterior to the two prostatic reservoirs instead of being in between them, and the vaginal complex consisting of the vagina, vaginal reservoir, vaginal duct whose proximal portion has a muscular expansion, and seminal receptacle.

Nasoancyrocephalus n. g.

Dactylogyridae, Ancyrocephalinae. Opisthohaptor with two pairs of anchors, the roots of which are unequal or subequal and longitudinally striated, and two dissimilar bars. No compact eye-spots. Mouth in front of pharynx; pharynx muscular; caeca terminating separately. Testes two, juxtaposed in posterior half of body proper. Vas deferens running forward, left side of copulatory organ. Seminal vesicle muscular, just postbifurcal, anterior to two prostatic reservoirs. Prostatic reservoirs surrounded by longitudinal or spiral muscle fibers. Cirrus tubular, with accessory pieces. Genital pore postbifurcal. Ovary just pretesticular. Vaginal complex consisting of vagina which opens on right margin of body, vaginal reservoir, vaginal duct whose proximal portion has a muscular expansion, and seminal receptacle. Canalis receptaculi seminis present. Vitellaria co-extensive with caecum. Gill parasites of marine teleosts.

Type-species: *Nasoancyrocephalus diorchis* n. sp.

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